

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2006-_____

WASTE DISCHARGE REQUIREMENTS
FOR
CALPINE SISKIYOU GEOTHERMAL PARTNERS, L.P., AND
CPN TELEPHONE FLAT, INC., AND
U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE AND
U.S. DEPARTMENT OF INTERIOR, BUREAU OF LAND MANAGEMENT
GLASS MOUNTAIN UNIT GEOTHERMAL
EXPLORATION AND DEVELOPMENT PROJECTS
SISKIYOU COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Central Valley Water Board) finds that:

1. On 28 March 2003 Calpine Corporation and CPN Telephone Flat, Inc., submitted a Report of Waste Discharge requesting a revision of waste discharge requirements (WDRs), Order No. 95-199 adopted on 17 August 1995 by the Central Valley Water Board. Order No. 95-199 prescribed requirements for a discharge from the drilling and flow testing of geothermal exploration wells, specifically soil, rock cuttings, drilling mud with additives, oil and associated wastewaters to lined sumps. Order No. 95-199 was issued to California Energy General Corporation (hereafter CEGC), and U.S. Department of Agriculture, Forest Service, (hereafter USFS), and covered activities in the entire Glass Mountain Geothermal Unit Lease Area* including Fourmile Hill Exploration Project which is entirely within the North Coast Regional Water Quality Control Board (hereafter North Coast Water Board) boundary and Telephone Flat Project which is within the Central Valley Region. Calpine Corporation purchased CEGC in October 2001, and changed the name to CPN Telephone Flat, Inc. Other leases owned by Calpine Corporation were moved to their wholly owned subsidiary Calpine Siskiyou Geothermal Partners, L.P., in May 2003. The Report of Waste Discharge was deemed complete on 11 April 2003.
2. The Glass Mountain Geothermal Unit Lease Area is in Siskiyou County on public land in the Modoc, Shasta-Trinity, and Klamath National Forests as shown in Attachment A, a part of this Order. The National Forests are administered by the USFS. The U.S. Department of Interior, Bureau of Land Management (hereafter BLM), has authority to issue leases for, and make determinations on all geothermal activities to be conducted on federal lands. The USFS, as administrator of the property at which the discharge is to occur, and the BLM as administrator of the geothermal resource, are named as dischargers in the WDRs. Calpine Siskiyou Geothermal Partners, L.P., and CPN Telephone Flat, Inc., now own all Glass Mountain geothermal leases. Calpine Siskiyou Geothermal Partners, L.P., and CPN Telephone Flat, Inc., USFS and BLM are hereafter

designated as Discharger. The Glass Mountain Geothermal Unit Lease Area encompasses Sections 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, and 36, T44N, R3E; Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, and 27, T43N, R3E; Sections 19, 30, 31, 32, 33, 34, 35, T44N, R4E; and Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, and 20, T43N, R4E, MDB&M as shown on Attachment A.

3. The proposed Telephone Flat Geothermal Development Project is approximately 1.5 miles east of Medicine Lake, within the Medicine Lake Basin, which is part of the Pit River drainage basin and within the watershed boundary of the Central Valley Water Board. The Fourmile Hill Exploration and Development Project is approximately 3 miles northwest of Medicine Lake, outside the Medicine Lake Basin, in the Klamath River drainage basin within the watershed boundary of the North Coast Water Board.
4. This Order regulates only the transfer of geothermal fluid from geothermal fluids sump to well head for re-injection, storage of geothermal fluid prior to re-injection, storage of drilling mud and cuttings, storage of hazardous materials used in the drilling operation and the monitoring of surface and groundwater quality. Re-injection from the well head to the geothermal aquifer, including but not limited to approval of wells for re-injection, flow rate and volume of geothermal fluids injected, well location, casing design, casing leak detection, additives, leak detection and inspection is regulated by BLM and the U.S. Environmental Protection Agency (USEPA).
5. This Order includes terminology specific to geothermal well drilling and the regulation of geothermal exploration and development. As these terms may not be familiar to those outside the industry, a Glossary of Terms has been included in the Information Sheet, a part of this Order by reference. Terms appearing in the glossary are marked with an asterisk the first time they are introduced. A list of the Environmental Documents pertinent to this Order with a brief description for each is also included in the Information Sheet.
6. A Memorandum of Agreement (MOA), among Calpine Corporation, CPN Telephone Flat, Inc., North Coast Water Board, and the Central Valley Water Board, was signed and became effective on 30 August 2002. The MOA states that each regional water board shall regulate the geothermal "exploration" activities within their respective regions. However, the Central Valley Water Board shall regulate the entire Glass Mountain Exploratory Project until the North Coast Water Board is able to adopt WDRs for the parts of the Glass Mountain Exploratory Project that lie within their region. On 27 June 2002, the North Coast Water Board adopted waste discharge requirements

Order No. R1-2002-0030 for a discharge of geothermal fluid and associated wastes from geothermal exploration operations by the Discharger in the Fourmile Hill area, an area previously covered under the Central Valley Water Board waste discharge requirements Order No. 95-199. Order No. R1-2002-0030 named Calpine Corporation, the USFS, and BLM as Dischargers. On 26 September 2002 the North Coast Water Board adopted Order No R-1-2002-0089, which revised Order No. R1-2002-0030 to allow Calpine Corporation to transfer geothermal fluids to geothermal wells within the Central Valley Region for re-injection.

GEOTHERMAL OPERATIONS

7. The Report of Waste Discharge and supplemental information submitted by the Discharger presented a list of proposed new wells and temperature gradient holes* that may be drilled and/or tested. All of these new wells and temperature gradient holes have been referenced in environmental documents. The listing is as follows:

Temperature Gradient Hole Nos. 34-8, 42-13, 11-24, 15-15, and 63-20.

Geothermal Well Nos. 18-32, 46-32, 56-18, 58-6 and 13-18. The location of these wells is shown on Attachment B, a part of this Order by reference. (*Glass Mountain Unit Geothermal Exploration Project, Environmental Assessment/Initial Study, EA#CA027-EA95-06, April 1995*). The Government will not authorize Well Nos. 18-32 and 46-32, both of which are in the USDA Forest Service Mt. Hoffman Inventoried Roadless Area until a National Environmental Policy Act (NEPA) review is completed. The original Environmental Assessment (EA) did not discuss or disclose the potential effects of the loss of roadless characteristics due to constructing and utilizing these wells and associated facilities.

Geothermal Well Nos. 26-7, 84-7, 46-8 (existing pad with no well), 64-8, 68-8 (existing well on pad with sump), 73-13, 87-13 (existing well on pad with sump), 15-16, 26-17, 31-17 (existing well on pad with sump), 72-17, 13-18, 16-18, 25-18, 51-18, 52-18, 56-18 and 83-18. The location of these wells is shown on Attachment C, a part of this Order by reference. (*Telephone Flat Geothermal Development Project Environmental Impact Statement/Environmental Impact Report (EIS/EIR), February 1999, and Update Assessment for the Telephone Flat Geothermal Development Project EIS/EIR, November 2002*)

During drilling of temperature gradient holes the Discharger proposes to truck all drill cuttings to an approved offsite disposal site. Alternatively the Discharger may discharge cuttings from temperature gradient holes to unlined cuttings sumps, provided that the cuttings are confirmed to be non-hazardous. Drill cuttings from wells and temperature

gradient holes may not be discharged to geothermal fluids sumps. In addition to the drilling of new geothermal wells and temperature gradient holes, the Discharger proposes to flow test existing geothermal wells, including Wells Nos. 68-8, 31-17 and 87-13 in the Telephone Flat Area as shown on Attachment D a part of this Order by reference. The Discharger is required to re-inject these geothermal fluids to existing wells within the Glass Mountain Known Geothermal Resource Area (KGRA)* provided that such activity has been approved by BLM and USEPA for that purpose. (*Glass Mountain Exploration, E A/I S, CPN Telephone Flat, Inc., May 2002*).

8. The Discharger proposes in the Report of Waste Discharge to use acid for “formation stimulation*” in the production zone of existing Well Nos. 68-8, 31-17 and 87-13 or any new well in the Telephone Flat Area. BLM issued a sundry notice [approval] in April 2003 for the formation stimulation of Well No. 31-17 by injection of hydrofluoric/hydrochloric acid. This is the only well in the KGRA presently approved by BLM for formation stimulation. BLM has determined that formation stimulation will not be permitted on any additional wells until the completion of additional ~~NEPA~~ environmental review. This Order ~~also prohibits limits~~ formation stimulation only to Well No. 31-17 and does not authorize formation stimulation on any other well within Telephone Flat or Fourmile Hill Unit Lease Areas, until BLM has approved such actions and the additional CEQA and NEPA environmental review has been completed if necessary. ~~Upon completion of environmental review, and approval of the Executive Officer, this Order will be reopened, if necessary, to allow formation stimulation of additional wells and specify any additional conditions to address mitigation measures relevant to water quality.~~

To insure re-injection remains uninterrupted, the Discharger will maintain two re-injection pumps, one primary and one spare, at each geothermal fluid sump being used for formation stimulation. Spare pumps will be tested on a regular basis to insure they remain in operating condition. A spill plan for the materials to be used in the stimulation has been prepared as required by BLM.

9. This Order covers the entire Glass Mountain Geothermal Unit Lease Area with the exception of Section 28, T44N, R3E, MDB&M, which is in the Fourmile Hill Exploration Project and is regulated by the North Coast Water Board. This Order includes Well Nos. 64-27 and 85-33 both of which lie within the North Coast Region. These wells are referenced in the Glass Mountain Exploration EA/IS of May 2002, not the Fourmile Hill Exploration EA/IS of December 1995. If the North Coast Water Board adopts additional WDRs for geothermal activities, they will take precedence over this Order for the portions of the Glass Mountain Geothermal Unit Lease Area they regulate.

10. This Order regulates discharges associated with the drilling and testing of geothermal wells including land clearing, well pad construction, sump construction, fluids discharged to sumps, geothermal fluid transfer, and the fluids from chemical addition of acid to the wells. These activities are referenced in the environmental documents referenced in Finding No. 5 which appear in the Information Sheet. Well locations associated with these environmental documents are shown on Attachments B, C, and D. "Exploration" in this Order means land clearing, well drilling, well pad construction, formation stimulation ("well workovers"), sump construction, well testing, installation of sumps, geothermal fluid transfer, re-injection of geothermal fluid, temporary storage of petroleum fuels and other activities that are referenced in environmental documents entitled "Exploration Project" or "Exploration."

"Development" in this Order means all the elements of Exploration referenced in documents entitled "Telephone Flat Geothermal Development Project." In addition Development includes plant construction, and transmission line construction, which are also referenced in environmental documents entitled "Telephone Flat Geothermal Development Project." ~~Plant operation activities~~ Construction and operation of a power plant including disposal of sanitary and industrial wastes from the ~~production~~ power plant are not regulated by this Order, ~~and but~~ will be addressed in a new Order to be adopted after-if appropriate prior to commencement of plant construction, ~~but before plant operation has begun~~. Prior to plant operation, sanitary waste disposal will be by means of portable chemical toilets.

11. Wastes produced during drilling operations include soil, drill (rock) cuttings, drilling muds with additives, oil and associated wastewater. Drilling mud is inert mineral clay such as bentonite clay. Drilling mud additives may include sodium bicarbonate, soda ash, drilling soap, organic polymers, wood fibers, graphite, cottonseed hulls, walnut shells and cement. Drilling mud additives do not render the drilling mud hazardous when used according to manufacturer's specifications. During drilling operations, drilling mud, aerated mud and/or air will be used to transport drill cuttings to the surface. Drilling mud will be treated and contained in a closed system for continuous circulation using metal tanks. Drilling mud may be re-used in the drilling of additional wells, provided it is stored in leak-free tanks constructed of steel or some other durable impervious material capable of withstanding the degree of mechanical shock likely to occur at the site. At the conclusion of drilling, drilling muds may be mechanically de-watered and discharged to a lined cuttings sump or transported offsite for disposal at a regulated drilling mud disposal facility. Liquid from the de-watering will be discharged to a geothermal fluids sump. Auxiliary tanks meeting the same specifications as the drilling mud tanks will be used to collect any extraneous rig runoff and wash water used for separating solid drill cuttings.

- a. Temperature Gradient Holes: Drill cutting solids from temperature gradient holes will be mechanically separated, and deposited in un-lined "temperature gradient hole* cuttings sumps" (approximately 5,000 to 25,000 gallon capacity) located adjacent to drilling pads. Excess cement slurry from temperature gradient holes will also be discharged to the temperature gradient hole cuttings sumps. A representative composite sample of temperature gradient hole drill cuttings will be taken at the completion of drilling. If sample analysis confirms that the cuttings are non hazardous and non designated wastes, the sump may remain open for future use. Wastes confirmed, "designated", as defined in Section 13173 of the California Water (CWC), or "hazardous" as defined in Article 1, Chapter 11, Division 4.5 of Title 22 California Code of Regulations (CCR), shall be removed and transported to an appropriate disposal site within 30 days after completion of test. Any temperature gradient hole* cuttings subsequently discharged to the sump must be sampled as required for the initial discharge. When the cuttings sumps have been filled to within two feet of the top, the Discharger may backfill with clean native soil, provided that all analysis have confirmed the contents of the sump to be neither hazardous nor designated.
 - b. Geothermal Wells: Drill cutting solids from geothermal wells will be mechanically separated, and deposited in lined "geothermal well cuttings sumps" (approximately 187,000 gallon capacity) located adjacent to drilling pads. These cuttings sumps are required to be constructed with a certified minimum two-foot thick clay liner, or equivalent synthetic liner, and tested to ensure a permeability of less than 1×10^{-6} centimeters per second (cm/sec). Excess cement slurry from the wells will also be discharged to the cuttings sumps. A representative composite sample of geothermal well drill cuttings will be taken at the completion of drilling. If sample analysis confirms that the cuttings are non hazardous and non designated waste materials, the sump may remain open for future use. Wastes confirmed, "designated", as defined in Section 13173 of the California Water Code (CWC), or "hazardous" as defined in Article 1, Chapter 11, Division 4.5 of Title 22 California Code of Regulations (CCR), shall be removed and transported to an appropriate disposal site within 30 days after completion of test. Any well cuttings subsequently discharged to the sump must be sampled as required for the initial discharge. When the geothermal well cuttings sumps have been filled to within two feet of the top, the Discharger may backfill with clean native soil, provided that all analysis have confirmed the contents of the sump to be neither hazardous nor designated waste.
12. Bore cleanout and flow tests will be performed at the completion of drilling to remove drilling cuttings and mud and evaluate the well for geothermal production. Fluids produced from these operations will be confined to lined "geothermal fluid sumps" with

an approximate capacity of 750,000 gallons each. These sumps are required to be constructed with a certified minimum two-foot thick clay liner, or equivalent synthetic liner, and tested to ensure a permeability of less than 1×10^{-6} cm/sec. All fluid contents of the sump must be re-injected to an existing BLM approved and USEPA compliant geothermal well within 60 days of the completion of testing for the current season or in no case later than **1 November** in any calendar year. Small quantities of residual fluids and/or accumulated solids in the sumps will be sampled and analyzed to confirm that they are neither hazardous nor designated waste. If residual material is non designated and non hazardous, the sumps may be left open until it is determined that there will be no further geothermal fluid discharge to the sump, or the sumps are full. At this point the sumps will be back-filled and capped with a soil layer capable of supporting vegetative growth. The USFS has requested that one or more of the geothermal fluids sumps be left unfilled after closure in order that they may fill with rainwater and snowmelt and provide wildlife habitat.

13. Exploration and Development include the flow testing of new and existing wells. The Discharger proposes to flow test Well Nos. 68-8, 31-17 and 87-13, existing geothermal wells in the Telephone Flat area as shown on Attachment D. Geothermal fluid pumped from wells will be pumped to geothermal fluid sumps before re-injection. The Discharger may also drill and test a well at well pad site 46-8. There is a sump approximately 10 years old at this site, which the Discharger intends to use if and when the well is drilled. In this case, the Discharger would be required to test the sump liner in order to demonstrate the existence of a two-foot compacted clay liner having a permeability of less than 1×10^{-6} cm/sec. The geothermal fluids from Well Nos. 68-8, 31-17 and 87-13 will be discharged to existing geothermal fluid sumps adjacent to the wells. Each of these sumps was originally constructed with a two-foot compacted clay liner and is required by this Order to have a permeability of less than 1×10^{-6} cm/sec. Because the geothermal fluid sumps have been unused for over ten years, re-compaction, and permeability testing will be required. Permeability testing must be conducted by, or under the direct supervision of a licensed professional Civil Engineer or certified Engineering Geologist, registered in the State of California. At the completion of each well test, any remaining fluids in the adjacent geothermal fluids sump will be re-injected to a geothermal well approved by BLM and USEPA. The lines from the sumps to the re-injection wells will be approximately six-inch diameter steel with grooved clamped joints tested at twice the operating pressure. ~~It is the Discharger's intent to eventually replace the aboveground lines with double walled underground lines with leak detection system as described in Provision D.11.~~
14. Well Nos. 68-8, 31-17 and 87-13 have not been tested since 1989-91. Chemical analysis of fluid from these three wells is presented in the attached Information Sheet. The

existing analytical data suggests that the geothermal fluid from these wells may contain arsenic and mercury. In previous analyses, the Discharger analyzed for mercury using an inductively coupled plasma - mass spectrometry (ICP/MS) method. This Order requires the Discharger to use the ultra clean sampling protocol and analysis by cold vapor atomic absorption (CVAA) (USEPA Method 1631) for all future sampling events.

15. The actual number and location of production and injection well sites to be used during the Telephone Flat Development Project will depend on the results of drilling, testing, and the response of the geothermal reservoir. The expected startup production well sites are: 16-18, 13-18, 52-18 (or 51-18), and 56-18; and the expected startup injection well sites are: 68-8 (existing), 72-17, and 15-16. Well sites 46-8 (existing well pad with no well), 84-7 and 31-17 (existing) could be either production or injection well sites depending on project needs. The other identified well pad locations: 26-7, 64-8, 73-13, 25-18 and 83-18, would be used if supplemental production or injection is required as “make-up” over the life of the project.
16. The proposed exploration and development includes construction of two new well pads for drilling, completion and flow testing of two deep production size wells, 85-33 and 64-27. These two sites are immediately south and east of Fourmile Hill and are in the North Coast Region. The wells will be drilled to a depth of approximately 9,000 feet and flow tested for up to 30 days. Prior to drilling the well at 64-27, the Discharger plans to drill a temperature gradient hole to 6,000 feet or 500° F, whichever comes first. The Discharger proposes to re-inject geothermal fluid from flow tests in the Fourmile Hill Area including Well Nos. 85-33 and 64-27 to one or more wells in Telephone Flat. The geothermal fluids to be re-injected will be conveyed in aboveground steel pipe approximately 6 inches in diameter with grooved clamped joints. ~~It is the Discharger's intent to eventually replace the aboveground lines with double walled underground lines with leak detection system as described in Provision D-11. The Discharger no longer intends to replace these aboveground transfer lines with underground lines.~~ The approximate pipeline routes are shown in Attachments A and D. Potable water for use in the Telephone Flat exploration programs will be supplied from a CPN Telephone Flat, Inc., supply well or the USFS wells which are adjacent to geothermal Well No. 17A-6 in the Arnica Sink area, in Section 1, T43N, R3E and Section 6, T43N, R4E respectively.

APPLICABLE REGULATIONS, POLICIES AND PLANS

17. The Central Valley Water Board adopted a Water Quality Control Plan, Fourth Edition, for the Sacramento and San Joaquin River Basins (hereafter Basin Plan). The Basin Plan designates beneficial uses, establishes water quality objectives, and describes an

implementation program and policies to achieve water quality objectives for all waters of the Basin. These requirements implement the Basin Plan.

18. Medicine Lake Crater is a Hydrologic Subarea of the Pit River Hydrologic Unit, which is part of the Central Valley Basin. Beneficial uses of surface waters in the Medicine Lake Basin (Medicine Lake, Little Medicine Lake, Bullseye Lake, Blanche Lake, Payne's Springs I, II, III and Payne's Creek, Schonchin Spring, Crystal Spring, and an unnamed spring) are not specifically listed in the Basin Plan and there are no direct surface tributary streams to the Pit River. The Basin Plan states that for unidentified water bodies, the beneficial uses will be evaluated on a case-by-case basis. The USFS and BLM have listed the uses of surface waters within the Medicine Lake Highlands as domestic, recreation, and fish habitat.
19. The beneficial uses of the underlying groundwater are municipal and domestic supply, agricultural supply, and industrial supply.
20. State Water Resources Control Board (State Water Board) Resolution No. 88-63, a policy entitled "Sources of Drinking Water," adopted May 19, 1988, provides that all surface and groundwaters of the State are considered to be suitable, or potentially suitable, for municipal or domestic water supply and should be so designated by the Regional Water Quality Control Boards, with certain exceptions. Among other exceptions, State Water Board Resolution No. 88-63 provides for exceptions where the aquifer is regulated as a geothermal energy producing source or has been exempted administratively pursuant to 40 CFR Section 146.4 for the purpose of underground injection of fluids associated with the production of hydrocarbon or geothermal energy, provided that these fluids do not constitute a hazardous waste under 40 CFR Section 261.3.
21. The Safe Drinking Water Act, (SDWA), authorizes USEPA to regulate "underground injection" which is defined in 40 U.S.C. Section 1421 (d) (1) as the "subsurface emplacement of fluids by well injection." The regulation of all injection wells is covered in Part 144 of the Code of Federal Regulations under the underground injection control (UIC) program. The regulations in this part establish minimum requirements for the UIC Program. Class V injection wells on federal land in California are administered by USEPA under the SDWA. Geothermal production wells on federal land are regulated by the BLM. The proposed Order requires Calpine Siskiyou Geothermal Partners, L.P. and CPN Telephone Flat, Inc. to comply with BLM and USEPA standards for injection wells. The Central Valley Water Board considers these standards to be protective of water quality.

22. The USEPA, on 16 November 1990, promulgated storm water regulations (40 CFR Parts 122, 123, and 124) which require specific categories of industrial facilities which discharge storm water to obtain NPDES permits and to implement Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) to reduce or eliminate industrial storm water pollution.
23. The State Water Board adopted Order No. 97-03-DWQ (General Permit No. CAS000001), on 17 April 1997, specifying waste discharge requirements for discharge of storm water associated with industrial activities, excluding construction requirements, and requiring submittal of a Notice of Intent (NOI) by industries covered under the permit. All storm water at the existing Telephone Flat well sites will be contained on-site as well pads are bermed and all runoff is directed to the geothermal fluids sumps. Consequently these facilities will not be required to obtain coverage under the General Industrial Storm Water Permit. However, land clearing, well pad construction, and road construction for new wells require coverage under the General Construction Storm Water Permit. The Discharger has obtained coverage under the General Construction Storm Water Permit (WDID No. 5R476320945) for those activities.

SITE DESCRIPTION SURFACE AND GROUNDWATER CONSIDERATIONS

24. Medicine Lake Highlands is a shield volcano* on the Modoc Plateau east of Mt. Shasta covering a 750-square-mile area with approximately 140 cubic miles of surficial volcanic rocks. Medicine Lake Highlands stands above the general landscape and is generally perceived as a water source for streams, regional aquifers, springs, and wells. Two hydrologic units have been identified within the Medicine Lake Highlands; the shallow groundwater system that occurs only within the highlands, and the geothermal reservoir. The shallow system is a perched system that occurs at an elevation of approximately 3,300 feet higher than the regional groundwater system of the Modoc Plateau. The water source for the shallow system is infiltration of precipitation, primarily snowmelt. The shallow groundwater is separated from the geothermal reservoir by a thick sequence of non-porous highly altered volcanic rocks, which form a thick impermeable cap. Groundwater elevations are highest in the center of Medicine Lake Highlands with flow moving radially away from the center.
25. Within the Medicine Lake Basin there are four lakes, including Medicine Lake, Little Medicine Lake, Blanche Lake, and Bullseye Lake. Surface drainage in the Telephone Flat area and the sections outside that area covered in this Order, is tributary to either Medicine Lake or Arnica Sink. A number of springs and intermittent streams exist within

and adjacent to Telephone Flat, including Paynes Springs I, II and III Crystal Springs, Schonchin Spring, and an unnamed spring, as shown on Attachments A and B. The almost total absence of perennial stream flow in the Medicine Lake Highlands results from the combination of relatively low precipitation (largely snowfall in the winter) and highly permeable volcanic soils and lava flows.

26. Soils in the project area are described as well drained to excessively well drained sandy loams formed in materials weathered from extrusive igneous rocks overlain by young pumice and ash deposits.
27. The groundwater table on the flanks of the Medicine Lake caldera is described as erratic, varying from about 300 ft to over 1000 ft below ground surface. Within the caldera of the Medicine Lake Highlands the depth to the first major aquifer is generally about 200 ft.
28. The groundwater hydrology of Medicine Lake Highlands is controlled by a number of factors including:
 - a. Thick and highly permeable surficial deposits of lava flows, cinders, and pumice, which readily allow infiltration of precipitation.
 - b. A saturated thickness (groundwater interval) that generally ranges from a few hundred feet to about 2000 feet.
 - c. An impermeable, high temperature gradient zone that underlies the groundwater saturated zone and forms a thick (1500 feet to several thousand feet) obstruction to flow between the groundwater aquifer and the geothermal system.
 - d. Radial outflow of groundwater away from the caldera rim of the Medicine Lake Highlands (i.e. down the regional hydrologic gradient).

As a result of (c.) above and the casing design imposed by BLM, the impacts to groundwater will be insignificant, provided the Discharger complies with the requirements of BLM and USEPA and the prohibitions, specifications, provisions, and mitigations measures prescribed in this Order and the attached Monitoring and Reporting Program.

29. Annual precipitation for the Medicine Lake area is estimated to be 35 to 45 inches, with an average of approximately 43 inches. Precipitation occurs primarily as snow. The mean evaporation for the area is approximately 50 inches per year (California Department of Water Resources).
30. Fresh water within the project area, primarily for dust suppression use and drilling activities, will be either trucked in or supplied from an existing water supply well within

the Arnica Sink area. Fresh water may be pumped from the supply wells to other sites within the project area.

CEQA AND LEGAL CONSIDERATIONS

31. In 1996, Calpine Corporation submitted a Plan of Operation to BLM for construction and operation of a 49.9 MW geothermal power plant in the Fourmile Hill area in the North Coast Region. A Draft EIS/EIR for the project was distributed to the public for review and comment in July 1997. In February 1997 CEGC submitted a Plan of Operation (POO)* to the BLM for construction and operation of a 48 MW geothermal power plant in the Telephone Flat area in the Central Valley Region. In May 1998 a Draft EIS/EIR for the project was distributed to the public for review and comment. On 31 May 2000 separate Records of Decision (RODs) were issued by the USFS and BLM for the two power plant projects described above. The Fourmile Hill Plan of Operation was approved as amended. The Telephone Flat Plan of Operation was denied on the basis of its effect on American Indian use of Medicine Lake and on American Indians as a minority population. CEGC did not present the EIR to the CEQA lead agency, Siskiyou County Air Pollution Control District (SCAPCD), for approval. However, in a letter dated 17 April 2002, Calpine Corporation, the new owner of CEGC, requested the SCAPCD to certify the EIR.

On 4 April 2002, the United States Department of Justice and CPN Telephone Flat, Inc., reached an agreement to resolve breach of contract and litigation concerning the denial of the Telephone Flat Geothermal Development Project. As part of the settlement agreement, the BLM and USFS were to reconsider the May 2000 ROD, which denied the project. In turn CPN Telephone Flat, Inc., agreed to suspend litigation against the United States until the reconsideration was complete. The reconsideration took into account the President's National Energy Policy and other changes in the renewable energy field, which had occurred since the May 2000 decision. The settlement directed both BLM and USFS to complete reconsideration by November 2002.

On 26 November 2002 the BLM and USFS approved development of the 48 MW geothermal power plant at Telephone Flat by CPN Telephone Flat, Inc. The BLM and USFS determined that the environmental analysis conducted under provisions of NEPA was still valid, but that the increased national and state focus on renewable energy, along with the further mitigation measures required, including realignment of the transmission line to reduce visual and Native American concerns, justified approval of the project. A determination of NEPA adequacy and a Biological Opinion (no jeopardy) accompanied the decision.

32. An Update Assessment to the *Telephone Flat Geothermal Development Project EIS/EIR, February 1999*, was prepared for the SCAPCD, in November 2002, to provide information to determine if recirculation of the EIR would be required prior to certification. The Update Assessment found there to be no new circumstances or information relevant to environmental concerns and bearing on the project. Further, the Update Assessment found no additional feasible mitigation measures, that are considerably different from others previously analyzed in the final EIR/EIS, which would clearly lessen or reduce the previously identified environmental impacts to a level of insignificance and which were declined to be adopted by the project sponsor. The SCAPCD by and through the Air Pollution Control Officer (APCO) concluded in its Findings of Fact and Statement of Overriding Considerations that the economic, social, and other benefits of the project would override any significant environmental impacts. The APCO certified the Telephone Flat Geothermal Development Project EIR (State Clearinghouse No. 97052078) on 14 February 2003. An administrative appeal of the APCO's decision to certify the EIR was denied by the SCAPCD by and through its Board of Directors on 25 March 2003, at which time the SCAPCD Board took the following actions affirming the APCO's conclusions:

- Certification of an EIR for the Telephone Flat Geothermal Development Project (State Clearinghouse No. 97052078); and
- Adoption of a Mitigation Monitoring and Reporting Program (Statement of Decision 03-01); and
- Adoption of Findings of Fact and Statement of Overriding Considerations for the Telephone Flat Geothermal Development Project (Statement of Decision No. 03-01); and
- Adoption of the Second EIR Errata (Statement of Decision 03-01).

The Central Valley Water Board is a responsible agency for the purposes of CEQA. The Central Valley Water Board has considered the CEQA and NEPA documents prepared for this project and finds that the CEQA and NEPA documents are suitable for purposes of its use as set forth in 14 California Code of Regulations (CCR) section 15231 and that no subsequent EIR is required pursuant to 14 CCR section 15162. The CEQA and NEPA documents evaluated the potential impacts to waters of the state and the Central Valley Water Board has included mitigation and monitoring to address identified impacts as described below.

COMPREHENSIVE HYDROLOGY MONITORING PLAN

33. The environmental documents certified for the exploration and development projects require the Discharger to perform mitigations related to water quality as follows:

1. Glass Mountain Unit Geothermal Exploration Project (EA # CA027-EA95-06). The Mitigated Negative Declaration for this project contained the following mitigation measures:
 - a. *“In order to verify that no effects are occurring at Paynes Springs from implementation of wells at well pads 56-18 and 13-18, CEGC,^[1] will collect water samples from the springs before drilling, during initial drilling, after drilling to 500 feet (the equivalent elevation to the springs), and after completion of these wells. If effects are identified after analysis of the samples, drilling at these wells will be halted until the hydrologic connection to the springs is better understood. BLM and the USFS will compare the samples after they are analyzed.”* (Mitigation Measure 4.3.1)
2. Glass Mountain Exploration (EA# CA320-NEPA02-23). The mitigated negative declaration for this project contained the following water quality related mitigation measures:
 - a. *“Calpine shall inspect and promptly repair each sump, and pipeline after a seismic event of magnitude 5.0 or greater.”* (Mitigation Measure 4.3-1)
 - b. *“Inspect integrity of sumps at well sites 68-8, 31-17, and 87-13 and repair as necessary.”* (Mitigation Measure 4.3-2)
 - c. *“Remove geothermal fluid in sumps within 60 days of discharge.”* (Mitigation Measure 4.5-10)
3. Telephone Flat Geothermal Development Project (SCH # 97052078). The EIR for this project contained the following water quality related mitigation measures:
 - a. *“The Project Applicant, CEGC, has submitted a proposed hydrology monitoring plan to the BLM. The Project Applicant shall implement the approved monitoring plan in coordination with hydrologic monitoring which may be required for the Fourmile Hill Geothermal Project and in conformance with the monitoring requirements of the BLM and USFS. The proposed hydrology monitoring plan includes, but is not limited to the following*

¹ “CEGC” and “Calpine” were the predecessors in interest to Calpine Siskiyou Geothermal Partners, L.P., and CPN Telephone Flat, Inc. As successors in interest, Calpine Siskiyou Geothermal Partners, L.P., and CPN Telephone Flat, Inc., have assumed the responsibility to implement mitigation measures assigned to predecessors “CEGC” and “Calpine.”

- *Collection of baseline water level and water quality data*
- *Monitoring of water level in wells*
- *Monitoring lake stages; and*
- *Monitoring well, spring, and lake water quality”*
(Other Measure 3.2.3.3-3a)

- b. *“If hydrologic monitoring detects adverse effects that can be reasonably demonstrated to have been caused by project production or injection of geothermal fluids, the Project Applicant shall make appropriate changes to the wellfield production and injection to remedy the observed adverse effects.”*
(Other Measure 3.2.3.3-8)
- c. *“The Project Applicant shall prepare an Emergency Release Contingency Plan which defines the control and restoration measures to be implemented in the event of a well blowout, sump overflow, or pipeline rupture.”*
(Other Measure 3.2.3.4-13)

34. Compliance with these water quality related mitigation measures are included as requirements in these WDRs and attached Monitoring and Reporting Program. The updated Medicine Lake Basin Comprehensive Hydrology Monitoring Plan submitted by the Discharger appears in Attachment E of these WDRs and is incorporated as part of Monitoring and Reporting Program No. _____. The Monitoring Plan is perceived by BLM and the USFS as a dynamic document that will change as project requirements change. The Central Valley Water Board, BLM and the Telephone Flat Development Project Oversight Committee have reviewed the updated version of the Comprehensive Hydrology Monitoring Plan. The Discharger proposes a combination of groundwater monitoring adjacent to each development project site and area wide baseline data collection/water quality monitoring. The Discharger proposes a monitoring frequency of twice annually, unless otherwise specified in the individual project WDRs. Prior to start-up of the either the Telephone Flat Development Project or the Fourmile Hill Development Project, Calpine Siskiyou Geothermal Partners, L.P., and CPN Telephone Flat, INC. will complete installation of a minimum of three shallow groundwater monitoring wells and one deep groundwater monitoring well at the respective project site. In addition to these project specific monitoring wells, several domestic water wells, natural springs and lakes within the Basin will also be monitored. The surface springs, lakes, and domestic wells that will be monitored were identified in USGS Open-File Report 95-750. The EIR/EIS does not require the mitigation measures for the Telephone Flat Development Project to take effect until the development project begins; however, CPN Telephone Flat, Inc., has voluntarily begun monitoring many of the sites in the

Monitoring Plan. CPN Telephone Flat, Inc., has submitted a report presenting data gathered on the water quality of lakes and wells sampled twice during 2002.

PROCEDURAL REQUIREMENTS

35. State Water Board Resolution No. 68-16, *Statement of Policy with Respect to Maintaining High Quality of Waters in California*, (hereafter Resolution 68-16) requires the Central Valley Water Board, in regulating the discharge of waste, to maintain high quality waters of the State until it is demonstrated that any change in quality will be consistent with the maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in the Central Valley Water Board's policies (e.g., quality that exceeds water quality objectives). Threats to water quality resulting from the project include sediment discharge from soil disturbance, discharge of geothermal fluid to ground surface as a result of transfer pipe leakage, spills and leaks of hazardous materials used during drilling operations. Soils at the project site are highly permeable and drainage courses are relatively few and widely separated. Additionally the exploration and development takes place during the summer months after snowmelt has ceased. As a result it is very unlikely that any spill or disturbed soil would be conveyed to a stream, spring, lake or other water course. Furthermore the Discharger is required to obtain coverage under the NPDES General Construction Storm Water Permit and implement appropriate erosion control measures. Geothermal fluids and cuttings from geothermal wells are required by this Order to be held in sumps with a two-foot compacted clay liner having a permeability of less than 1×10^{-6} cm/sec. Geothermal fluid may not be held in sumps for more than 60 days and in no case later than **November 1** of any calendar year. The Discharger is also required to conduct regular inspections of geothermal fluid transfer lines and to prepare a spill prevention plan for the hazardous materials used in well acidification (formation stimulation). A minimum of three shallow and one deep groundwater monitoring well is required at each project site. The conditional discharge as permitted herein is consistent with the provisions of State Water Board Resolution No. 68-16 because the impact on water quality will be insignificant.
36. The Discharger is required to document that the existing sumps as originally constructed had a compacted clay liner of minimum two-foot thickness and a minimum permeability of 1×10^{-6} cm/sec. Because the sumps in Telephone Flat have not been used for more than 10 years and may have developed cracks due to periods in which the liners were desiccated, the Discharger will be required to re-compact these liners and retest them to confirm that the permeability requirement is being met. Tests for all sump liners must be

conducted by, or under the supervision of, a licensed professional Civil Engineer or Certified Engineering Geologist registered in the State of California. The Discharger is required in Provision D.12. to retain snow melt water in geothermal fluids sumps and to accurately measure the level of water in the sumps daily over a period of at least one week for any sump that will receive geothermal fluid within twelve months. The purpose of this requirement is to determine if there are leaks in the sumps. Discharge of geothermal fluid to a sump which has not been leak tested within twelve months of the discharge is prohibited by this Order. The flow testing of geothermal wells will proceed for approximately 30 days and the Discharger is required to empty the sumps of geothermal fluids within 60 days of testing. This means that geothermal fluid will be in the sumps for a maximum of 90 days, minimizing the opportunity for percolation of geothermal fluids to groundwater. Spent acid is flowed back to the surface, discharged to the well site sump, and immediately injected back into the geothermal reservoir minimizing the opportunity for percolation of spent acid to groundwater.

37. The Discharger has submitted an updated Comprehensive Hydrology Monitoring Plan to BLM for approval, and is required to implement the plan as part of the mitigation in the Telephone Flat Development EIR/EIS. The installation of three shallow and one deep groundwater monitoring well is proposed in the Comprehensive Hydrology Monitoring Plan. Implementation of the Plan is not required by the EIR/EIS until the Discharger has initiated the Development Project. However the Discharger has voluntarily begun some of the monitoring contained in the Comprehensive Hydrology Monitoring Plan. In response to a request by staff, the Discharger submitted a report prepared by Earth Systems Southwest dated 5 May 2006 that discussed the rationale for groundwater monitoring and specified the monitoring well locations. Staff reviewed the report and identified deficiencies. Provision D.11 of these WDRs requires the Discharger to submit an additional report that proposes the location of the three shallow and one deep monitoring well for Executive Officer approval after consideration of comments by interested parties. Provision D.11 also provides requirements for the timing of installation of monitoring wells. Installation of the wells must be completed prior to the injection of acids or other Enhanced Geothermal System (EGS) materials and/or the testing of additional geothermal wells, and in no case later than 1 November of the year in which development is initiated.
38. The discharge of drilling mud and cuttings from well drilling operations to an on-site sump is exempt from the requirements of Title 27, of the California Code of Regulations (CCR), as set forth in Section 21565 of Title 27. The exemption, pursuant to Section 20090(g) of Title 27, applies to operations where:

- a. Discharges of wastes are to on-site sumps and do not contain halogenated solvents, and
 - b. The Discharger removes all wastes from the sump or
 - c. The Discharger removes all free liquid from the sump and covers residual solid and semi-solid wastes, provided that representative sampling of the sump contents after liquid removal shows residual solid wastes to be nonhazardous. If the sump has appropriate containment features, it may be reused.
39. The Central Valley Water Board has considered the information in the attached Information Sheet in developing the Findings of this Order.
40. Section 13267(b) of the California Water Code (CWC) states, in part, that:

“In conducting an investigation specified in subdivision (a), the Regional Board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging or who proposes to discharge within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste outside of its region that could affect the quality of waters of the state within its region shall furnish under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs of these reports shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.” Monitoring and Reporting Program No. R5-2006-____ is necessary to assure compliance with these waste discharge requirements and is established pursuant to CWC Section 13267.
41. The Central Valley Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge, and has provided them with an opportunity for a public hearing and an opportunity to submit written comments.
42. The Central Valley Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED that Order No. 95-199 be rescinded and that Calpine Siskiyou Geothermal Partners, L.P., and CPN Telephone Flat, Inc., and U.S. Department of Agriculture, Forest Service, and U.S. Department of Interior, Bureau of Land Management, their agents,

successors, and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following:

A. Discharge Prohibitions

1. The discharge of any waste not authorized nor disclosed by the Discharger is prohibited.
2. The discharge of geothermal injection fluids, drilling mud, spent acids used for formation stimulation, drill cuttings, petroleum products, or other waste streams associated with exploration and development of geothermal resources in a manner contrary to that described in Finding Nos. ~~6, 7~~, 8, 10, 11, 12, 13, 15 and ~~15~~ 16 is prohibited.
3. The discharge of wastes, other than storm water (in compliance with the General Construction Storm Water Permit), to surface waters, or surface water drainage courses is prohibited.
4. The use of geothermal fluids generated during drilling/testing activities, for purposes other than specified herein, is prohibited. This includes but is not limited to the use of these fluids for dust control on access roads, well pads, or other developed project locations.

~~5. The injection of acids or other Enhanced Geothermal System (EGS) materials to wells other than Well No. 31-17 is prohibited until BLM completes NEPA review and issues sundry notices.~~

~~6.5.~~ The injection of geothermal fluids from wells that have recently undergone acidification or EGS treatment to Well Nos. 85-33 or 64-27 is prohibited unless approved by BLM and/or USEPA and the North Coast Water Board.

6. The discharge of geothermal fluids to a sump which has not been monitored for leaks within twelve months as described in Provision D.12 and the Monitoring and Reporting Program is prohibited.

B. Discharge Specifications

1. The discharge, including geothermal fluid extraction and re-injection shall not cause a pollution or nuisance as defined by the CWC Section 13050.
2. Waste produced during the drilling pad site preparation, road construction, and road maintenance shall be placed where it will not enter waters of the State.

3. Waste confinement barriers shall be protected and maintained to ensure their effectiveness. All construction spoils shall be adequately protected from erosion using applicable best management practices at all times and shall be maintained continuously. Appropriate best management practices for run-on controls shall be implemented on all construction spoils at all times and shall be maintained continuously.
4. All spent acid waste and geothermal fluids produced during drilling or well testing shall be contained in tanks, lined geothermal fluids sumps, or other appropriate containment structures as approved by the Executive Officer. The Discharger shall re-inject spent acid waste immediately and maintain two re-injection pumps, one primary and one spare, at each fluid sump being used for formation stimulation. The Discharger shall re-inject all other geothermal fluid within the sumps as soon as possible and not more than 60 days after the completion of testing into any existing geothermal well covered in this Order provided such action is in compliance with applicable USEPA guidelines (see 40 CFR Part 144) and BLM's geothermal resource Orders and approved by BLM and USEPA. In no case shall the geothermal fluid remain in the geothermal fluids sumps later than **1 November** in any calendar year.
5. All geothermal well cutting sumps and geothermal fluid sumps shall be lined with a minimum thickness of two feet compacted clay, or an equivalent geosynthetic liner, certified and tested to ensure the permeability is no more than 1×10^{-6} cm/sec. If a geosynthetic liner is used, a suitable underliner shall be used to prevent liner damage. In order to prevent perforation of the sump liner by root growth, sumps and sump berms shall be kept free of vegetative growth.
6. The Discharger shall maintain a minimum of two feet of freeboard (measured vertically to the lowest point of overflow) in all sumps containing fluid liquid wastes to accommodate seasonal precipitation and to prevent overtopping from wind and wave action.
7. When it is determined that there will be no further discharge to temperature gradient hole cuttings sumps, geothermal well cuttings sumps or geothermal fluid sumps, or when the sumps are full, and samples demonstrate that in-place wastes are neither designated nor hazardous, all cuttings sumps and fluid sumps, except those left open to provide wildlife habitat as requested by the USFS, shall be backfilled and ground graded to contour. The cutting sumps and fluid sumps shall be capped with one foot of clay having a permeability of no greater than 1×10^{-6} cm/sec. A minimum of one foot of soil capable of supporting vegetative growth shall be placed over the clay cap.

8. All petroleum products, acids, hydraulic fluids, drilling mud additives or other liquid materials shall be stored and used in such a manner that all spills are contained.
9. All geothermal wells shall be drilled and constructed in accordance with BLM guidelines to prevent degradation of groundwater or intermixing of groundwater from different aquifers.
10. In the event of seismic activity of magnitude 5.0 or greater, the Discharger shall inspect each of the sumps and pipelines and promptly repair any leaks or other damage that has occurred.
11. Appropriate self-contained sanitary facilities shall be provided at each testing site while the site is in use.

C. Financial Assurance

1. BLM has required the Discharger to post financial assurance for cessation of exploration activities, or closure of a power plant if one is constructed, which includes the following activities:~~closure, including the following activities:~~ Plug and abandon 18 geothermal wells, reclaim 18 wellpads, reclaim the sumps on each of the 18 wellpads, remove 1.8 miles of water lines from Arnica Sink, remove 7.9 miles of production and injection pipelines, plug 3 water monitoring wells, abandon 11.5 miles of roads within wellfield, reclaim powerplant pad site, tear down and remove powerplant, cooling tower, ancillary buildings, and foundations within plant site and tear down and remove 23 miles of 230 KV transmission line. If these financial assurance funds become encumbered for some purpose other than site closure, or become unavailable for site closure for any reason, the Discharger shall immediately notify the Central Valley Water Board, and the Discharger shall, **within 30 days of such notification and by 30 April of each year thereafter**, prepare and submit, plans with detailed cost estimates and a demonstration of assurances of financial responsibility for closure and post closure as described above. Under such circumstances, the Discharger shall provide the assurances of financial responsibility to the Central Valley Water Board Executive Officer as required by Title 27 CCR, Division 2, Subdivision 1, Chapter 6. The assurances of financial responsibility shall name the Central Valley Water Board as beneficiary. The Discharger shall adjust the cost annually to account for inflation and any changes in facility design, construction, or operation.
2. The Discharger shall, **by 30 April of each year (beginning 30 April 2007)**, prepare and submit, plans with detailed cost estimates and a demonstration of

assurances of financial responsibility for initiating and completing corrective action for all known or reasonably foreseeable releases arising from the exploration and/or development of geothermal resources within the areas covered by this Order~~Telephone Flat project area or those areas of the Fourmile Hill project area under the jurisdiction of the Central Valley Water Board~~. The Discharger shall provide the assurances of financial responsibility to the Central Valley Water Board as required by Title 27 CCR, Division 2, Subdivision 1, Chapter 6. The assurances of financial responsibility shall provide that funds for corrective action shall be available to the Central Valley Water Board upon the issuance of any order under California Water Code, Division 7, Chapter 5. The Discharger shall adjust the cost annually to account for inflation and any changes in facility design, construction or operation. The financial assurance fund for corrective action shall be established and approved by the Executive Officer prior to any of the following actions (but no later than 30 April 2007): the discharge of geothermal fluid, cuttings from geothermal wells or temperature gradient holes to sumps, or the performance of formation stimulation.

D. Provisions

1. The Discharger shall comply with Monitoring and Reporting Program R5-2006_____ which is part of this Order, and any revisions thereto as ordered by the Executive Officer.
2. The Discharger shall comply with all the items of the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements," dated 1 March 1991, which are a part of this Order. This attachment and its individual paragraphs are referred to as "Standard Provision(s)."

~~3. Prior to the discharge of geothermal fluid, cuttings from geothermal wells or temperature gradient holes to sumps, or the performance of formation stimulation but not later than 30 April 2007, the Discharger shall establish Financial Assurance funds for corrective action, and if the BLM financial assurance funds become unavailable, closure and post-closure maintenance activities as provided in C. Financial Assurance above~~

3. The Discharger shall limit use of formation stimulation by acids to Well No. 31-17 until use of formation stimulation by acids is approved by BLM for other wells and this Order is revised if necessary following additional environmental review. The revised Order may require additional monitoring well installation.

4. The Discharger shall provide for the transfer of geothermal fluids between geothermal fluids sumps and injection wells by means of an aboveground piping system.
45. The Discharger shall comply with the standards contained in the Health and Safety Code, Chapter 6.67, Aboveground Storage of Petroleum. As required by the act, the Discharger shall submit a Spill Prevention Control and Countermeasure, (SPCC), Plan prepared by a licensed professional Engineer registered in the State of California. The SPCC Plan shall be updated a minimum of every three years or within 30 days of any significant process change. All updates shall be certified by a licensed professional Engineer registered in the State of California and submitted to the Central Valley Water Board. In addition to the SPCC Plan for storage of petroleum, the Discharger shall prepare a hazardous material spill/release contingency plan and provide appropriate training to all project employees on the proper response to potential releases of other chemicals such as hydrochloric acid and hydrofluoric acids. The hazardous material spill/release contingency plan shall be submitted to the Central Valley Water Board prior to the storage or use of hazardous materials on site.
56. The Discharger shall develop and implement a plan for rapid immediate detection of leaks or failures in the aboveground pipelines carrying geothermal fluid for re-injection. An alarm or shutoff device shall be installed on the pump used in the geothermal fluid transfer pipeline. Pumping of geothermal fluids shall be suspended immediately following major pipeline failure. The plan shall include daily inspection of the entire length of aboveground line in operation at the time, and the maintenance of a daily log. Minor leaks shall be repaired immediately upon being identified. Lines should be sign posted or marked to identify the fluid being pumped and alerting the public of the potential danger.
7. Prior to their use for the containment of geothermal fluids, the Discharger shall submit evidence that new geothermal fluids sumps were constructed with liners having a minimum thickness of two foot and permeabilities no greater than 1×10^{-6} cm/sec. Prior to their use, the Discharger shall re-compact the liners in the four existing geothermal fluid sumps, (68-8, 31-17, 87-13 and 46-8) in the Telephone Flat area and retest the liners to confirm that permeabilities are no greater than 1×10^{-6} cm/sec. Alternatively the Discharger may install equivalent synthetic liners as approved by the Executive Officer. All tests must be conducted under the direct supervision of a licensed professional Civil Engineer or Certified Engineering Geologist, registered in the State of California. Permeability test results shall be submitted to the Executive Officer prior to discharging waste to each sump. The Discharger shall install splash pans or other protective devices to

insure that erosion from the incoming geothermal fluid does not compromise the liner.

8. Upon completion of drilling operations, samples of accumulated solids shall be obtained from geothermal well and temperature gradient hole cuttings sumps. Analyses of the solids shall be submitted to the Executive Officer to demonstrate that the solids are neither hazardous nor designated and if so confirmed may be buried in place as described in Finding No. 10. Wastes confirmed to be “designated” as defined in Section 13173 of the (CWC), or “hazardous” as defined in Article 1, Chapter 11, Division 4.5 of Title 22 (CCR), shall be removed and transported to an appropriate disposal site within 30 days after completion of testing, weather permitting. All cuttings sumps shall be backfilled and the ground graded to contour natural conditions within 90 days following completion of drilling. If the cutting sumps cannot be closed within the time period, the Discharger shall provide a report to the Executive Officer within 90 days of completion of drilling demonstrating why the sump cannot be closed and how the sumps will be protected. The report shall include a time schedule for sump closure. In no case shall cutting sumps remain open more than one year after completion of drilling operations unless they meet the requirement to remain open for future use.
9. Upon completion of the well tests and when residual liquids have been removed, samples of residual accumulated solids shall be obtained from all cuttings and geothermal fluid sumps. Analyses of the residue shall be submitted to the Executive Officer to demonstrate that it is compatible with on-site disposal and sump closure as described in Finding Nos. 10 and 11 and Discharge Specification D. 7. Wastes confirmed to be designated as defined in Section 13173 of the (CWC), or hazardous as defined in Article 1, Chapter 11, Division 4.5 of Title 22 (CCR), shall be removed and transported to an appropriate disposal site within 30 days after completion of testing. A time schedule for sump closure shall be provided by the Discharger and shall be approved by the Executive Officer.
10. A licensed professional Civil Engineer or Certified Engineering Geologist, registered in the State of California, shall be responsible for the design and construction of cuttings and geothermal fluid sumps, including material testing, construction, inspection, maintenance, and closure.
11. The Discharger has submitted a report prepared by Earth Systems Southwest dated 5 May 2006 which discusses the rationale for groundwater monitoring and specifies the monitoring well locations, which has been reviewed by Water Board staff. After consultation with Water Board staff and interested parties including BLM, USFS, United States Geological Survey (USGS), the Pit River Tribes and

the Mt. Shasta Bioregional Ecology Center, the Discharger shall submit for approval a revised report prepared by, or under the supervision of, and signed by a licensed professional Civil Engineer, Certified Engineering Geologist or Registered Geologist to the Executive Officer by **1 June 2007** which presents a rationale for monitoring well placement and specifies the location of the three shallow and one deep monitoring well as required in the "Medicine Lake Basin Comprehensive Hydrology Monitoring Plan" (Attachment E). After the location is approved by the Executive Officer, at least three shallow and one deep monitoring wells shall be installed prior to the performance of well acidification. The monitoring well installation shall commence prior to **15 August** and shall be completed no later than **1 November** in the year in which development or the testing of geothermal wells is initiated. After review of monitoring data these WDRs may be revised to include additional monitoring well installation. If hydrologic monitoring detects adverse impacts to water quality and these effects can be reasonably demonstrated to have been caused by testing of geothermal wells, or transfer or injection of geothermal fluids, BLM and Calpine Siskiyou Geothermal Partners, L.P. shall make appropriate changes to wellfield production and injection operations to cease the release of geothermal fluids causing adverse impacts to water quality.

12. ~~Finding No. 12 of this Order describes the above ground lines that are to be used for transfer of geothermal fluid from wells to geothermal fluid sumps and from sumps to the re-injection wells. This system is considered to be temporary, and it is the intention of Calpine Siskiyou Geothermal Partners L.P. to change from surface transfer of drilling water and geothermal fluid for injection, and to employ a dual wall underground piping system at some time in the future. **Three months prior** to installation of the new sub-surface system the Discharger must submit a report, which shall include plans and specifications for the new system. The specifications will include pipe diameters and material of construction, joining method, maximum operating temperature and pressure, method for leak detection and means of draining outer containment annular space. The report must also contain an assessment of the corrosion potential and the suitability of the specified piping materials. Central Valley Water Board staff will review these plans to insure that the proposed system will adequately protect water quality, and reopen the waste discharge requirements to make the appropriate revisions. During sump testing the Discharger shall install a level sensing device and pan evaporation equipment having an accuracy of within plus or minus 0.125 inches in any geothermal fluids sump intended for containment of geothermal fluids. Prior to a season when geothermal fluids will be discharged to a particular sump, that sump shall be allowed to accumulate snow melt, and the level of water in the sump and the pan evaporation device monitored daily for a period of at least one week. A hydraulic balance shall be performed on each sump taking into account rainfall and~~

evaporation. The level measurements described in this Provision are for the purpose of leak detection, and should be recorded separately from the measurements taken to demonstrate two foot of freeboard. At the completion of monitoring, the Discharger shall submit the monitoring results to Central Valley Water Board staff and repair or re-install the liner as directed by the Executive Officer.

13. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to this office.
14. The Discharger must comply with all conditions of this Order, including timely submittal of technical and monitoring reports as directed by the Executive Officer. Violations may result in enforcement action, including Central Valley Water Board or court orders requiring corrective action or imposing civil monetary liability, or in revision or rescission of this Order.
15. A copy of this Order shall, at all times, be kept at the discharge facility for reference by operating personnel. Key operating personnel shall be familiar with its contents.
16. The USFS as administrator of the property at which the discharge is to occur, is ultimately responsible for ensuring compliance with these requirements. The BLM has authority to issue leases for, and make determinations on all geothermal activities to be conducted on federal lands. Calpine Siskiyou Geothermal Partners, L.P., and CPN Telephone Flat, Inc., are responsible for compliance with these requirements including day-to-day operations and monitoring. Enforcement actions will be taken against the USFS and BLM only in the event that enforcement actions against Calpine Siskiyou Geothermal Partners, L.P., and CPN Telephone Flat, Inc., are ineffective or would be futile, or that enforcement is necessary to protect public health or the environment. In addition, since the USFS and BLM are public agencies, enforcement actions will only be taken against them only after they are given the opportunity to use their governmental powers to remedy the waste discharge.
17. The Board will review this Order periodically and may revise requirements when necessary.

WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2006-
CALPINE SISKIYOU GEOTHERMAL PARTNERS, L.P., AND
CPN TELEPHONE FLAT, INC., AND
U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE AND
U.S. DEPARTMENT OF INTERIOR, BUREAU OF LAND MANAGEMENT
GLASS MOUNTAIN UNIT GEOTHERMAL
EXPLORATION AND DEVELOPMENT PROJECTS
SISKIYOU COUNTY

-27-

I, PAMELA C. CREEDON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on _____.

PAMELA C. CREEDON, Executive Officer

JFR: sae